I. C. 7005

APRIL 1938

UNITED STATES
DEPARTMENT OF THE INTERIOR
HAROLD L. ICKES, SECRETARY

BUREAU OF MINES
JOHN W. FINCH, DIRECTOR

INFORMATION CIRCULAR

ACCIDENT EXPERIENCE OF LOUISIANA SALT MINES

BY

ERIC H. BROWN

AFTER THIS REPORT HAS SERVED YOUR PURPOSE AND IF YOU HAVE NO FURTHER NEED FOR IT, PLEASE RETURN IT TO THE BUREAU OF MINES, USING THE OFFICIAL MAILING LABEL ON THE INSIDE OF THE BACK COVER.

Generated on 2024-09-18 07:40 GMT / https://hdl.handle.net/2027/osu.32435030644009
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google

Digitized by Google

Original from
THE OHIO STATE UNIVERSITY

I.C. 7005,
April 1938.

INFORMATION CIRCULAR

UNITED STATES DEPARTMENT OF THE INTERIOR - BUREAU OF MINES

ACCIDENT EXPERIENCE OF LOUISIANA SALT MINES[1]

By Eric H. Brown[2]

INTRODUCTION

One of the best methods by which the results of accident-prevention work can be measured for any particular period is to keep an accurate record of the accident experience, which may then also be compared with the experience of others. The purpose of this report is to compare records of the salt-mining companies operating in Louisiana, and their assistance in making available their accident records is gratefully acknowledged.

PRODUCTION

Four companies produce salt in Louisiana - Avery Salt Co., Avery Island; Jefferson Island Salt Mining Co., Jefferson Island; Myles Salt Co., Weeks; and Carey Salt Co., Winnfield. Three of these companies operate within 30 miles of each other in the southern part of the State, and the other operates in the central part.

In 1936 Louisiana produced 551,103 tons of rock salt and 368,510 tons in solution as brine - a total production of 919,613 tons.

MINING METHODS

Methods of mining are virtually the same for all but one company. The mines are opened by shafts that vary in depth from 530 feet to 811 feet. At three properties, a modified room-and-pillar system is used; rooms are driven 60 to 75 feet wide, leaving 75- to 100-foot pillars. For a short distance, rooms are driven with a relatively low roof and then are carried forward on a series of benches until a height of 75 to 90 feet is reached. At the other mine, a square-block system is used and the mine is developed extensively with a roof about 16 feet above the floor. Salt is mined to a height of 50 feet in a few places only, depending upon market demands.

The salt is undercut by electrical cutting machines and is drilled for blasting with hand-operated electric drills. In two mines, salt is loaded by power shovels, in another by draglines, and in the fourth by hand shoveling.

1/ The Bureau of Mines will welcome reprinting of this paper, provided the following footnote acknowledgment is used: "Reprinted from Bureau of Mines Information Circular 7005."

2/ Senior safety instructor, Bureau of Mines, Birmingham, Ala.

Generated on 2024-09-18 07:44 GMT / https://hdl.handle.net/2027/osu.32435030644009
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from THE OHIO STATE UNIVERSITY

Haulage is by cable-reel locomotives in two mines; in the other two, storage-battery locomotives are used.

SURFACE PLANTS

After it is mined, the salt is prepared for shipment in plants at each mine. Preparation consists of crushing, sizing, cleaning, packing in boxes, cartons, sacks, and blocks, and finally loading into box cars or barges for transportation. Most of the packing is done by machines. Three of the companies also operate plants in which the waste material is dissolved in water and the salt is recovered by evaporation.

A greater number of employees is required for the preparation of salt for the market than for the actual mining; therefore, although hazards are of different types, there is greater man-hour exposure on the surface than underground.

ACCIDENT EXPERIENCE

Accident records were made available by two companies for a 4-year period and by the other two companies for a 5-year period. Time lost for accidents that resulted in permanent, total, or partial disability is charged as shown in table 1, which is the schedule used by the Bureau of Mines.

Generated on 2024-09-18 07:40 GMT / https://hdl.handle.net/2027/osu.32435030644009
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from THE OHIO STATE UNIVERSITY

TABLE 1. - Scale of time losses for weighing deaths and permanent injuries to show severity of accidents

Nature of injury	Degree of disability in percent of permanent total disability	Days lost
Death	100	6,000
Permanent total disability	100	6,000
Arm above elbow, dismembermemt or permanent disability of	75	4,500
Arm at or below elbow, dismemberment or permanent disability of	60	3,600
Hand, dismemberment or permanent disability of	50	3,000
Thumb, any permanent disability of	10	600
Any 1 finger, any permanent disability of	5	300
2 fingers, any permanent disability of	12-1/2	750
3 fingers, any permanent disability of	20	1,200
4 fingers, any permanent disability of	30	1,800
Thumb and 1 finger, any permanent disability of	20	1,200
Thumb and 2 fingers, any permanent disability of	25	1,500
Thumb and 3 fingers, any permanent disability of	33-1/3	2,000
Thumb and 4 fingers, any permanent disability of	40	2,400
Leg above knee, dismemberment or permanent disability of	75	4,500
Leg at or below knee, dismemberment or permanent disability of	50	3,000
Foot, dismemberment or permanent disability	40	2,400
Great toe, or any two or more toes, any permanent disability of	5	300
1 toe, other than great toe, any permanent disability of	0	0
1 eye, loss of sight	30	1,800
Both eyes, loss of sight	100	6,000
1 ear, loss of hearing	10	600
Both ears, loss of hearing	50	3,000

Accidents data are shown in tables 2, 3, 4, and 5 for each company, by years, from 1932 to 1936, inclusive. Data were not available for 1932 for Companies C and D.

TABLE 2. - Accident data for Company A

Year	Lost-time accidents			Days lost			Minor accidents
	Mine	Surface	Total	Mine	Surface	Total	
1932	0	0	0	0	0	0	18
1933	0	0	0	0	0	0	22
1934	0	0	0	0	0	0	11
1935	1	3	4	20	41	61	4
1936	0	4	4	0	658	658	12
Total	1	7	8	20	699	719	67

6378

Generated on 2024-09-18 07:39 GMT / https://hdl.handle.net/2027/osu.32435030644009
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from THE OHIO STATE UNIVERSITY

TABLE 3. - Accident data for Company B

Year	Lost-time accidents			Days lost			Minor accidents
	Mine	Surface	Total	Mine	Surface	Total	
1932	3	11	14	- no record -			46
1933	1	11	12	26	133	159	27
1934	7	16	23	453	300	753	35
1935	2	7	9	17	89	106	29
1936	4	7	11	69	145	214	29
Total	17	52	69	565	667	1232	166

TABLE 4. - Accident data for Company C

Year	Lost-time accidents			Days lost			Minor accidents
	Mine	Surface	Total	Mine	Surface	Total	
1932	--	--	--	--	--	--	No record.
1933	8	11	19	129	191	320	Do.
1934	2	5	7	29	502	531	Do.
1935	2	7	9	30	156	186	Do.
1936	3	6	9	62	153	215	Do.
Total	15	29	44	250	1002	1252	

TABLE 5. - Accident data for Company D

Year	Lost-time accidents			Days lost			Minor accidents
	Mine	Surface	Total	Mine	Surface	Total	
1932	--	--	--	--	--	--	--
1933	6	5	11	39	47	86	18
1934	8	8	16	56	238	294	23
1935	3	1	4	40	3	43	22
1936	0	1	1	0	46	46	23
Total	17	15	32	135	334	469	86

Table 6 is a comparison of the average number of employees with the accident experience of the four companies in total lost-time accidents and total time lost during the 4- or 5-year periods reported.

TABLE 6. - Summary of lost-time accident data for all four companies

Company	Years	Average no. of employees		Lost-time accidents			Days lost		
		Mine	Surface	Mine	Surface	Total	Mine	Surface	Total
A	1932-36	25	105	1	7	8	20	699	719
B	1932-36	50	185	17	52	69	565	667	1232
C	1933-36	50	180	15	29	44	250	1002	1252
D	1933-36	30	75	17	15	32	135	334	469
Totals		155	545	50	103	153	970	2702	3672

No fatalities occurred at any of the operations during the 5-year period. This is an excellent feature of the accident experience of Louisiana salt mines.

Generated on 2024-09-18 07:44 GMT / https://hdl.handle.net/2027/osu.32435030644009
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from THE OHIO STATE UNIVERSITY

Table 7 classifies the injuries and shows the number for each company.

TABLE 7. - Nature and number of injuries

Injury	Company				Total
	A	B	C	D	
Head	-	-	1	1	2
Face	-	1	-	-	1
Eyes	-	7	2	3	12
Shoulder	-	4	-	4	8
Arm	-	-	-	2	2
Wrist and hand	-	14	4	3	21
Fingers	4*	4	9	6	23
Chest	2	4	5	-	11
Back	-	12	7	3	22
Groin	1	1	-	-	2
Leg	1	6	4	2	13
Knee	-	1	2	1	4
Ankle	-	4	1	2	7
Foot	-	9	6	4	19
Toes	-	2	3	1	6
Totals	8	69	44	32	153

* One partial permanent disability.

The accidents, in decreasing order of frequency, were as follows:

Fingers, 23; back, 22; wrist and hand, 21; feet, 19; legs, 13; eyes, 12; chest, 11; and other parts of the body, 0 to 8 accidents. One partial permanent disability (loss of thumb) that resulted in 600 days lost time was charged to one company.

Due to methods used by some of the companies in keeping their accident records, it was impossible to classify accidents as to causes with any degree of accuracy.

Table 8 compares frequency and severity rates for the four companies. Rates for Company A are based on actual man-hours worked each year but are only approximate for the other three companies. The actual number of man-hours worked for Company B during 1936 was taken as the average for each of the other years in the period; for Companies C and D, the man-hours have been estimated for each year of the 4-year period.

TABLE 8. - Accident frequency and severity rates for the 4 companies

Year	Frequency rates				Severity rates			
	A	B	C	D	A	B	C	D
1932	0	23.13	-	-	0	-	-	-
1933	0	19.80	31.66	47.12	0	0.262	0.533	0.368
1934	0	37.93	11.66	68.54	0	1.242	.885	1.212
1935	15.34	14.85	15.00	17.13	0.234	.174	.310	.184
1936	14.11	15.15	15.00	4.75	2.322	.353	.358	.197

6378

Generated on 2024-09-18 07:36 GMT / https://hdl.handle.net/2027/osu.32435030644009
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from THE OHIO STATE UNIVERSITY

Table 9 shows the average frequency and severity rates of all mines entered each year from 1932 to 1936, inclusive, in the Nonmetallic Mine Group of the National Safety Competition conducted annually by the Bureau of Mines.

TABLE 9. - Average frequency and severity rates of Nonmetallic Mine Group, National Safety Competition

Year	Number of mines in competition	Average frequency rate	Average severity rate
1932	20	13.934	4.403
1933	18	23.347	.968
1934	20	23.761	10.020
1935	20	11.590	.577
1936	21	12.558	5.925

SAFETY ACTIVITIES

Accident-prevention activities of the four salt-producing companies are dependent mainly on close supervision by the operating officials. If outstanding safety records are to be made, however, it is necessary to introduce other safety activities to keep all employees "safety conscious." This statement is supported by the fact that Company A, which has the largest number of safety activities, also has the best accident record for the 5-year period reported. Monthly department safety meetings are conducted by foremen of this company, at which suggestions for prevention of accidents are accepted willingly. Two mass meetings - one for white and one for colored employees - are held each month. Another important feature is thorough inspection of mine and plant each month by a committee of three employees who report their findings at the mass meetings. Under supervision of the Bureau of Mines, 100 percent first-aid training also has been conducted for 5 consecutive years; this training, in which the employees themselves are interested, undoubtedly has had a definite effect on the accident record. The employees have a very good first-aid team that competes each year with teams from other companies. The company has received two Certificates of Honor awarded by the Joseph A. Holmes Safety Association for outstanding safety records. The first was awarded on March 6, 1933,

> For having operated from July 3, 1931, to January 1, 1933, with 410,248 man-hours of exposure without a lost-time accident. The mine, with an average of 20 underground employees, worked 847 days without a lost-time accident.

The second was awarded March 5, 1935,

> For operating the entire plant without a lost-time accident from July 3, 1931, to January 29, 1935, a total of 1,003,998 man-hours. An average underground force of 20 worked in the mine 1,596 days, or 190,378 man-hours, without a lost-time accident.

Generated on 2024-09-18 07:36 GMT / https://hdl.handle.net/2027/osu.32435030644009
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from THE OHIO STATE UNIVERSITY

Company B conducts a monthly meeting of department foremen to discuss operating and safety problems. A monthly inspection of the plant and mine is also made by a committee of three employees. First-aid training has been conducted by the Bureau of Mines for a number of years, and 100-percent certificates were awarded in 1934 and 1937.

Company C has a safety committee consisting of foremen who attend monthly meetings to aid in the promotion of safety. For several years a number of its employees also have received first-aid training.

Company D depends almost entirely on supervision to prevent accidents. First-aid training started for the first time in 1937. A greater number of underground employees of this company wear hard hats than in the other companies.

CONCLUSION

There is every reason to believe that the accident experience in Louisiana salt mines will be improved still further; this can be accomplished by thorough training and instruction of individual employees, with the aim of having each of them take an active and interested part in the work of accident prevention. The classification and tabulation of accidents as to causes will show where and how the accidents are occurring, and thus the progress of safety work can be watched closely. Details in connection with accident figures permit true interpretations and should result in concentrated efforts for improvement.

Generated on 2024-09-18 07:40 GMT / https://hdl.handle.net/2027/osu.32435030644009
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from THE OHIO STATE UNIVERSITY